



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,616	06/19/2006	Stefan Kaeding	002664-9	8463
25570 7590 04/01/2010 ROBERT'S MLOTKOWSKI SAFRAN & COLE, P.C. Intellectual Property Department P.O. Box 10064 MCLEAN, VA 22102-8064				
			EXAMINER MERKLING, MATTHEW J	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 04/01/2010	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

lgallaugh@rmsclaw.com  
dbeltran@rmsclaw.com  
bdiaz@rmsclaw.com

### Office Action Summary

**Application No.**

10/596,616

**Applicant(s)**

KAEDING ET AL

**Examiner**

MATTHEW J. MERKLING

**Art Unit**

1795

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-16 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-16 and 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 13-15 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sennoun et al. (US 6,936,238) in view of Marchand et al. (US 2002/0114747).

**Regarding claims 13 and 18**, Sennoun discloses a reformer and method for converting fuel and oxidant into reformate, comprising:

an oxidation zone (90) connected to a supply of fuel (12) and a supply of oxidant (air, 18) and in which the fuel and oxidant are formed into an oxidized mixture (after being oxidized in oxidation zone 90);

a reforming zone (96), and an injection and mixture forming zone (38) between the oxidation zone and the reforming zone (see Fig. 3 which discloses such an arrangement)

to which at least a portion of the oxidized mixture from the oxidation zone is mixed with an injected supply (via injector 59) of additional fuel (col. 4 lines 55-62) and from which the mixture with the additional fuel is supplied to the reforming zone upon an at least partial oxidation of the fuel (fuel is partially oxidized in zone 94 and reformed in zone 96, col. 6 lines 40-53);

wherein the reforming zone is connected to a source of heat (such as the oxidation zone 90, which is in a heat exchange relationship with the reforming zone 96).

Sennoun teaches a method and apparatus in which an oxidation zone (90) is utilized during startup to quickly heat a reforming zone (96). Sennoun teaches that the heat transfer from the oxidation zone to the reforming zone is partially done indirectly through the apparatus wall (see Fig. 3 where oxidation zone 90 is separated from reforming zone 94 by a heat conducting wall which is not labeled). However, Sennoun does not teach an apparatus or method in which a portion of the gas mixture bypasses the injection and mixture forming zone (38).

Marchand also discloses a method of starting up a reformer (see paragraph 109).

Marchand teaches a method and apparatus in which the startup/heatup of the reforming catalyst is done by direct heat exchange in order to speed the heatup time of the catalyst and not be bound by the specific heat transfer capacity of a reactant tube (paragraph 109). In other words, Marchand teaches that direct heat exchange of the catalyst is preferable to indirect heat exchange (such as through a heat conducting wall).

As such, it would have been obvious to one of ordinary skill in the art to provide a direct path from the first oxidation stage (90) of Sennoun to the reforming zone (96) of

Sennoun (as suggested by Marchand) in order to provide a faster heatup of the catalyst due to a the direct heat exchange and one that is not bound by the specific heat transfer capacity of the apparatus walls. Such a configuration would provide for a passage for the mixed gas stream to bypass the injection and mixture forming zone and flow directly into the reforming zone.

**Regarding claims 14 and 19**, Sennoun further discloses the source of heat is an exothermic oxidation produced within the oxidation zone (see col. 2 lines 35-42 which discloses that the heat from the oxidation zone/first stage is transferred to the second stage/reforming zone).

**Regarding claims 15 and 20**, Sennoun further discloses the reforming zone is connected to an oxidant supply which supplies additional oxidant to the reforming zone (oxidant supply 61 is connected to the reforming zone 96 and supplies additional oxidant to it, see Fig. 3 and col. 4 lines 55-63).

**Regarding claim 21**, Sennoun further discloses the use of a liquid fuel (which is injected through injector 59) and will inherently be at least partially evaporated by thermal energy of the gas mixture delivered to the injection and mixing zone from the oxidation zone.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sennoun et al. (US 6,936,238) in view of Marchand et al. (US 2002/0114747) as applied to claim 13 above, and further in view of Kudo et al. (US 6,413,479).

**Regarding claim 16**, Sennoun discloses a tubular structure which discloses the oxidation zone and the reforming zone in close proximity to each other such that thermal energy is transferred from the oxidation zone to the reforming zone. More specifically, Sennoun teaches an apparatus where the oxidation zone (90) comprises at least one pipe which surrounds the reforming zone (96, see Fig. 3). However, Sennoun does not explicitly disclose a structure where the oxidation zone comprises at least one pipe which is arranged within the reforming zone.

Kudo also discloses an apparatus for which fuel is converted into a reformat (see abstract).

Kudo teaches an apparatus (Fig. 1) in which an oxidation zone (1) comprises at least one pipe which is arranged within the reforming zone (2). Kudo teaches such an arrangement in order to facilitate heat transfer from the oxidation zone to the reforming zone (col. 5 lines 31-34).

As such, reversing the configuration of Sennoun, such that the oxidation zone comprises at least one pipe which is arranged within the reforming zone (as taught by Kudo), would amount to nothing more than a simple substitution of one known element for another to yield an entirely predictable solution and would have been obvious to one of ordinary skill in the art at the time of the invention.

#### ***Response to Arguments***

5. Applicant's arguments filed 1/13/2010 have been fully considered but they are not persuasive.

On page 4, Applicant argues that the combination of Sennoun and Marchand does not lead to the claimed invention because Marchand does not teach the claimed "bypass". The examiner respectfully disagrees with this argument. Marchand teaches the benefits of direct heat exchange with a catalyst in order to expedite the heatup process during startup. It is the examiner's position that it would have been obvious to one of ordinary skill in the art to utilize the concept disclosed by Marchand, of quickly heating a reforming catalyst by direct heat exchange, in the method and apparatus of Sennoun in order to expedite the heatup process of the reforming catalyst. It is recognized that Marchand does not explicitly disclose a "bypass", but the concept of Marchand is sufficient to lead one of ordinary skill in the art to direct at least a portion of the gas mixture directly (bypassing all other areas of the apparatus) to the reforming catalyst to expedite the heatup of the reforming catalyst and commence the reformation reaction.

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./  
Examiner, Art Unit 1795

/Alexa D. Neckel/  
Supervisory Patent Examiner, Art Unit 1795